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(56) Documents Cited

GB 1303669 A EP 0130148 A2 US 3925959 A

(58) Field of Search

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INT CL⁵ B65B 9/10 9/12 51/26 51/30, B65D 75/40

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ONLINE DATABASES : WPI

(54) Form, fill and seal packaging with inclined transverse seals

(57) A method of making form, fill and seal packages (32) comprises supplying packaging film in the form of a web (20), converting the web into a continuous hollow tube (21), feeding a product (28) into the tube, pressure and heat sealing the filled tube at intervals, and cutting within the sealed areas (33, 35), characterised in that at least every other sealed area (33) makes an angle with the axis of the tube other than 90°.

Selection of the angle is made possible by rotary mounting (about axis 37) of assemblies comprising reciprocating sealing jaws (26 A/B) and cutters (27). Alternate sealed areas may make equal and opposite angles to the tube axis and either meet so that the packages are of isosceles or equilateral triangular shape or be spaced so that the packages have a trapeziform. Alternatively, the packages may be of diamond or rhombic shape, or of the shapes such as a chevron.

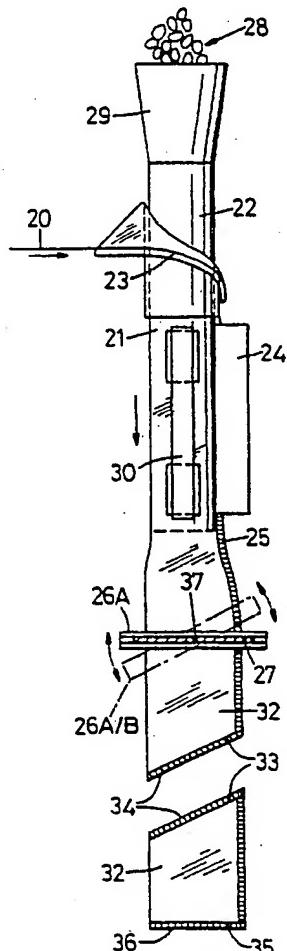
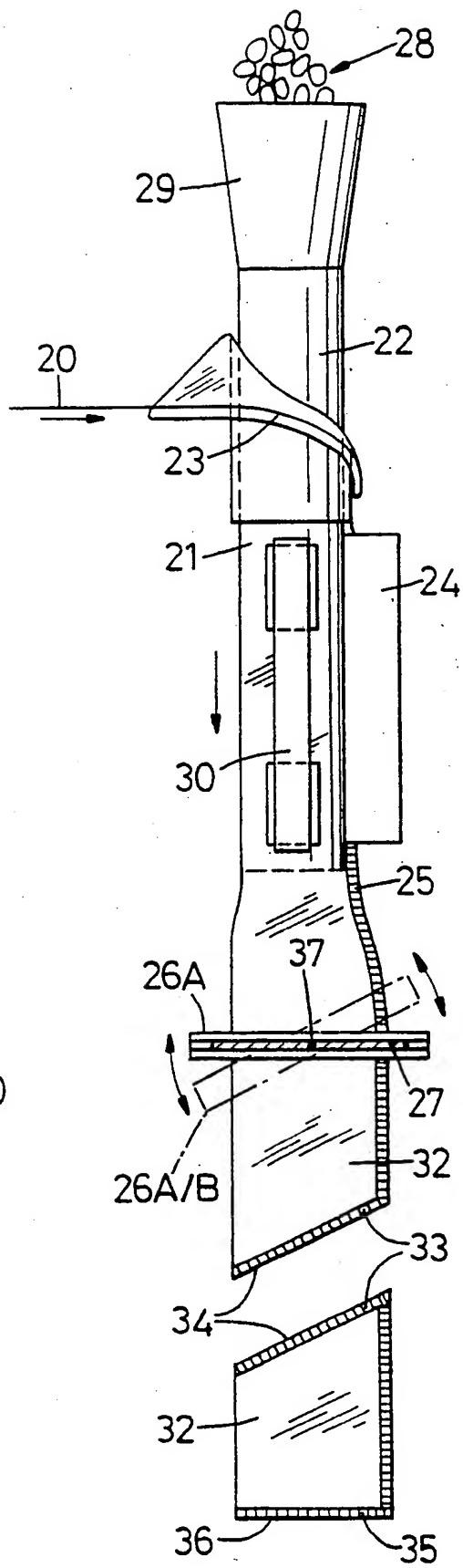
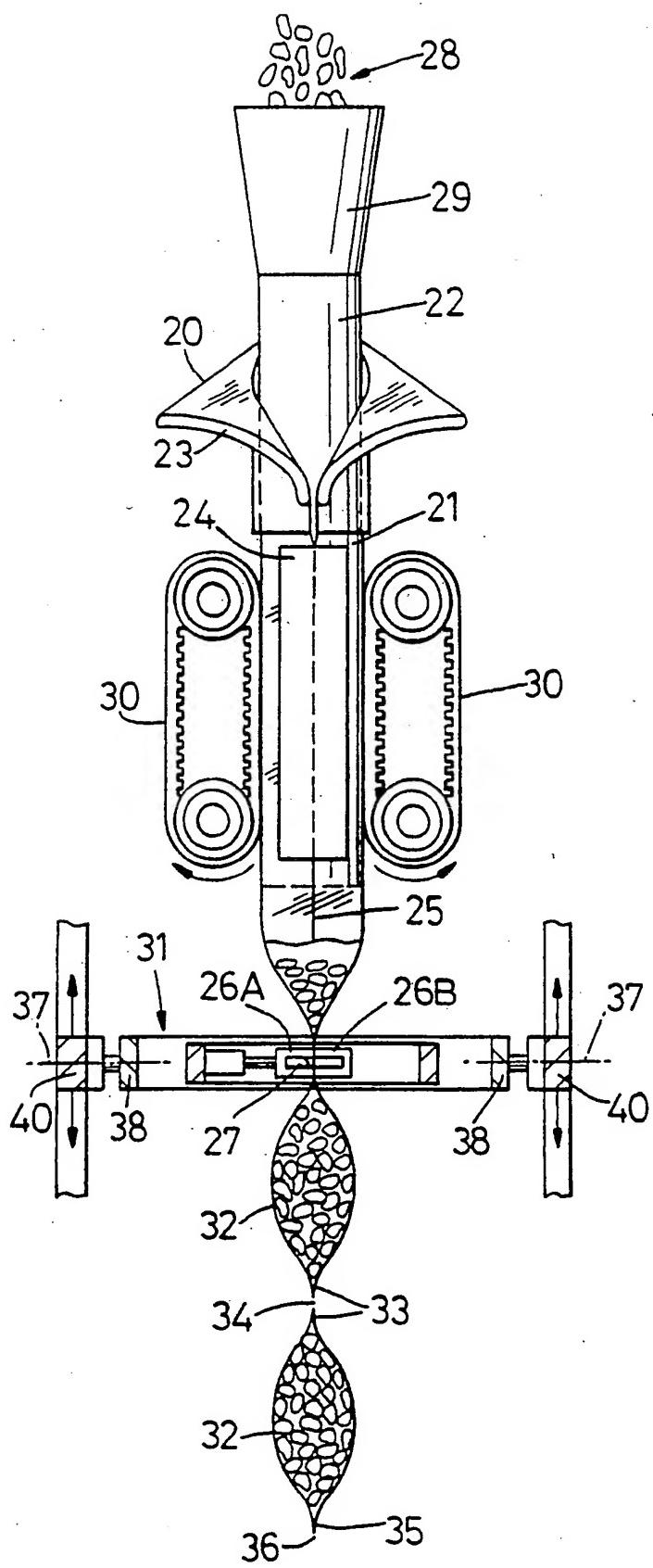


Fig. 2

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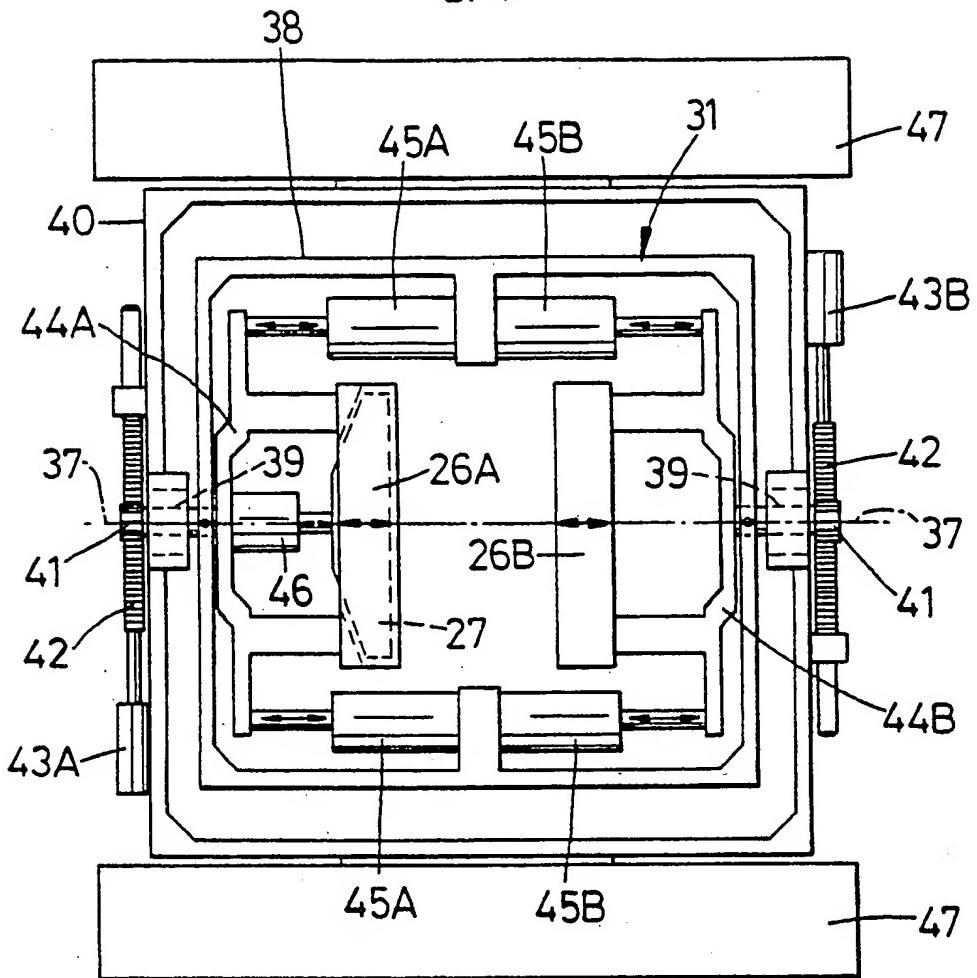


Fig. 3

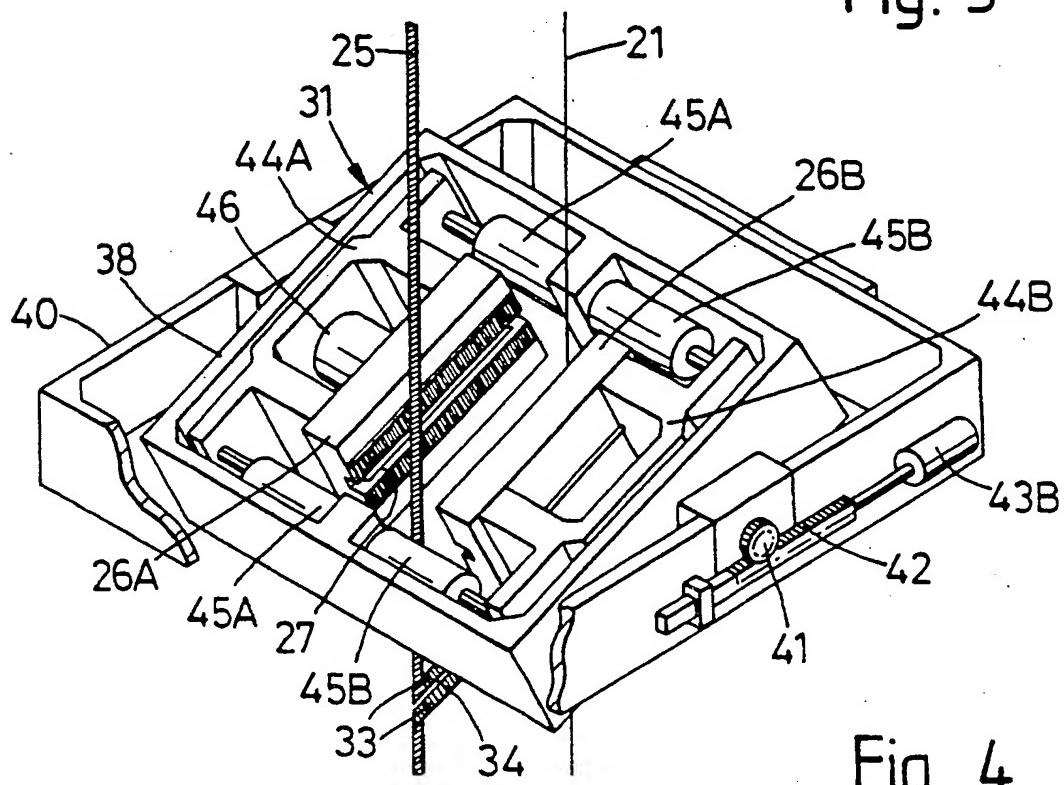


Fig. 4

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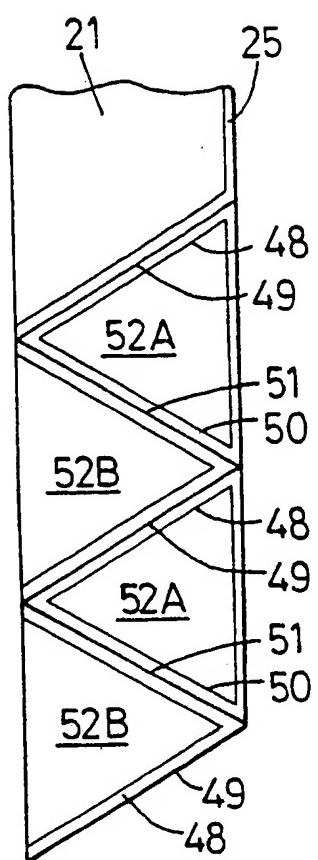


Fig. 5

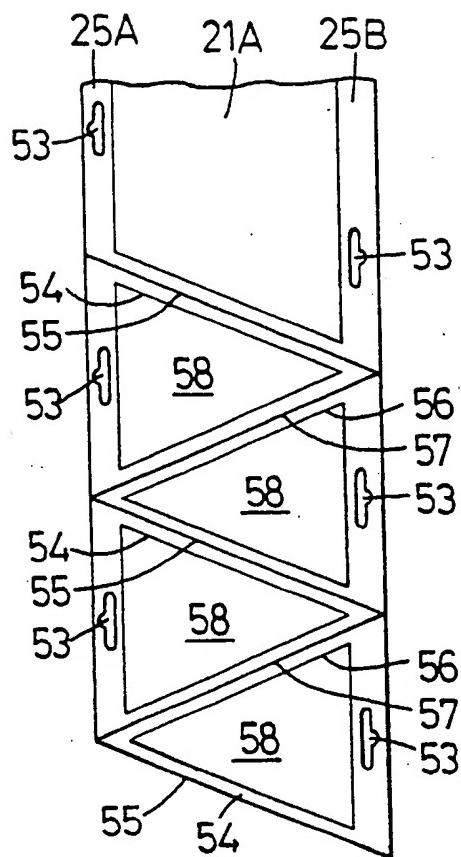


Fig. 8

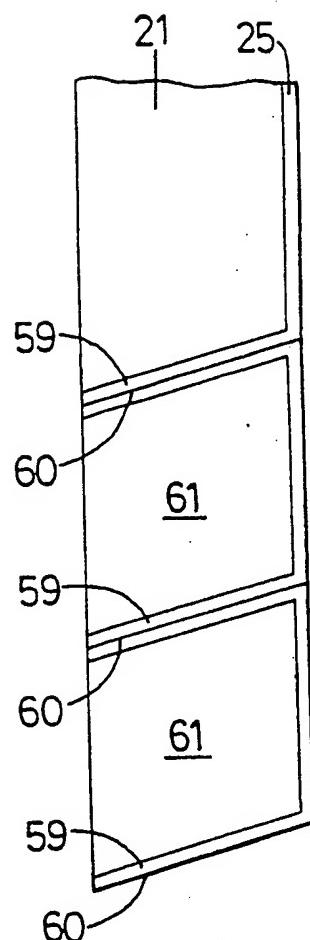


Fig. 10

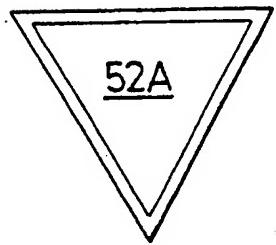


Fig. 6

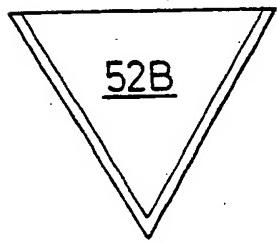


Fig. 7

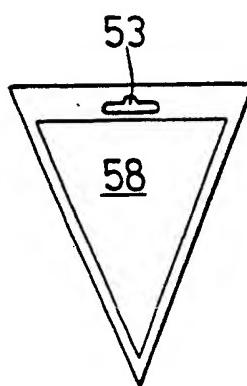


Fig. 9

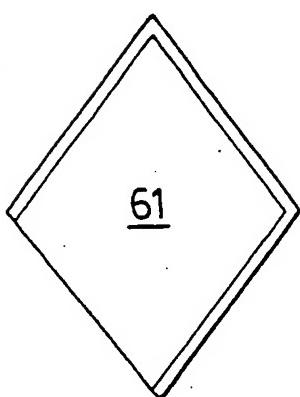


Fig. 11

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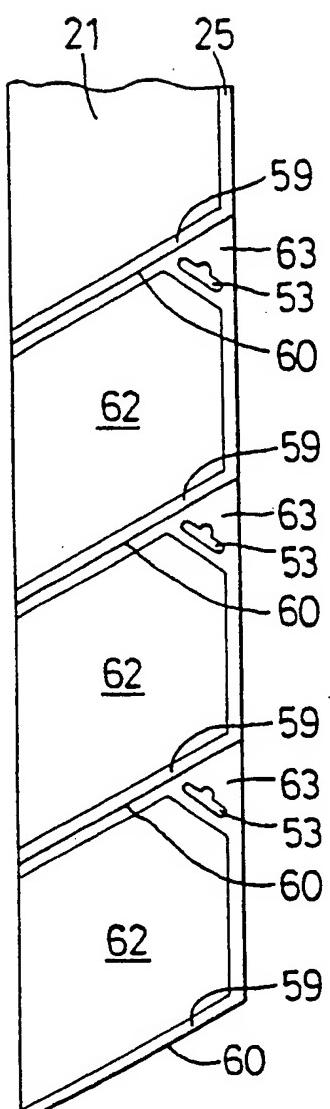


Fig. 12

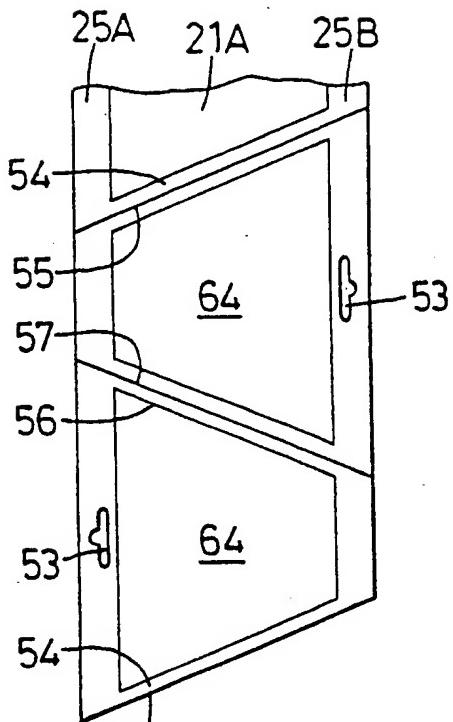


Fig. 14

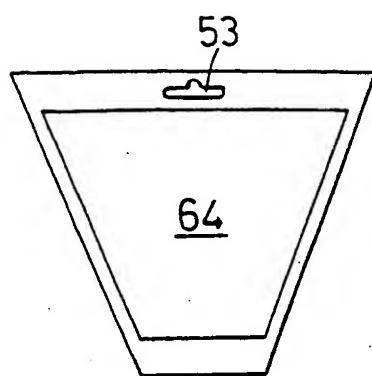


Fig. 15

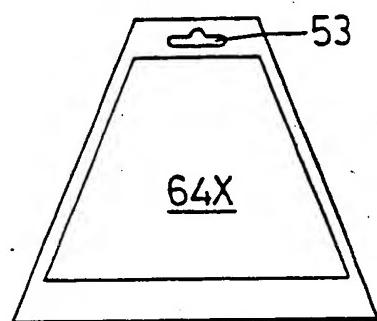


Fig. 16

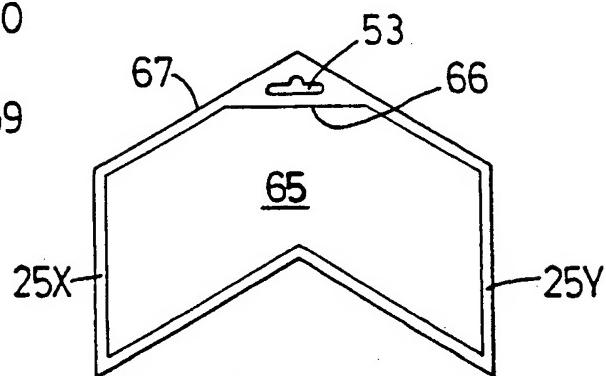


Fig. 17

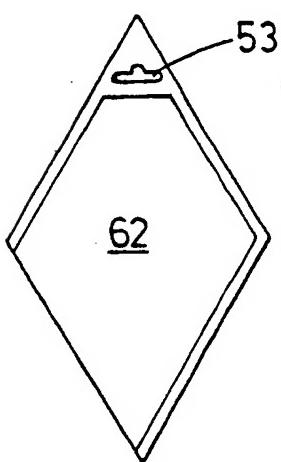


Fig. 13

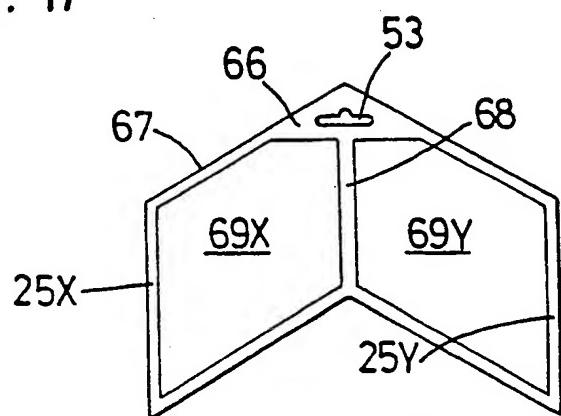


Fig. 18

Relevant Technical Fields		Search Examiner S R SMITH
(i) UK Cl (Ed.L)	B8C (CU32, CWS2, CW16, CW17)	
(ii) Int Cl (Ed.5)	B65B 9/10, 9/12, 51/26, 51/30; B65D 75/40, 75/44, 75/46, 75/48, 75/50	Date of completion of Search 17 NOVEMBER 1993
Databases (see below)		Documents considered relevant following a search in respect of Claims :- 1 TO 21
(i) ONLINE DATABASES : WPI		

Categories of documents

- X: Document indicating lack of novelty or of inventive step.
- Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.
- A: Document indicating technological background and/or state of the art.
- P: Document published on or after the declared priority date but before the filing date of the present application.
- E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 1303669	(REUTTER) - whole document, especially lines 64 to 83 of page 2	1, 4, 8, 9, 12, 15
X	EP 0130148 A2	(SIG) - see Figures 1 and 3 to 6	1, 4, 5, 6, 8, 9, 11, 12
X	US 3925959	(DYKES) - see lines 49 to 61 of column 2 and Figures 21 and 22	1, 8, 9

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

FORM, FILL AND SEAL PACKAGING

This invention relates to form, fill and seal packaging in which packaging film is supplied in the form of a web, the web is converted into a continuous hollow tube, a product is fed into the tube, the filled tube is pressure and heat sealed at intervals, and then cut within the sealed areas to create a consecutive series of filled packages, sometimes referred to as pillow-shaped bags.

Conversion of the web into a continuous hollow tube is usually effected over a hollow cylindrical mandrel or nozzle through which the product is fed, and reciprocating jaws effect the sealing and cutting. The jaws are frequently mounted on a carriage that is driven for movement in the direction of the bag forming. Stripper plates may be mounted below the sealing jaws, which stripper plates are brought by partial closing of the jaws into engagement with the tube to flatten it and strip any product from the zone to be subsequently sealed and cut upon completion of closing of the jaws.

The jaws are usually aligned perpendicular to the axis of the tube, but two such pairs of jaws spaced in the direction of the bag forming may be driven for movement in directions mutually perpendicular to each other to create tetrahedral shaped packages.

According to one aspect of the present invention, a method of making form, fill and seal packages comprises supplying packaging film in the form of a web, converting the web into a continuous hollow tube, feeding a product into the

tube, pressure and heat sealing the filled tube at intervals, and cutting within the sealed areas, characterised in that at least every other sealed area makes an angle with the axis of the tube other than 90°.

5 Thus, non-rectangular packages will be formed, the shape of which may or may not correspond to or be otherwise related to the shape of the product for example alternate sealed areas may meet and make equal but opposite angles to the axis of the tube so as to form packages of isosceles or equilateral triangular shape; and the packages may contain biscuits, chocolates or other confectionery of corresponding shape. On the other hand, the shape may merely be aimed at being distinctive of a particular type or source of product. For example, alternate sealed areas may be spaced in the direction of the bag forming and make the same angle to the axis of the tube so as to form packages of diamond or rhombic shape. Again, alternate sealed areas may be spaced in the direction of the bag forming and make opposite angles to the axis of the tube so as to form packages of trapeziform; and the angle to the axis of the tube may or may not be the same in alternate sealed areas.

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According to another aspect of the present invention, formed, filled and sealed packages made from a web of packaging film converted into a continuous hollow tube and sealed transversely at intervals are characterised in that at least every other sealed area makes an angle with the axis of the tube other than 90°.

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Preferably, alternate sealed areas make equal angles

to the axis of the tube. Thus, alternate sealed areas may meet at opposite angles so that the packages have an isosceles or equilateral triangular shape; alternatively alternate sealed areas making opposite angles may be spaced in the direction of the bag forming so that the packages have a trapeziform. Again, alternate sealed areas may be spaced in the direction of the bag forming and make the same angle to the axis of the tube so that the packages have a diamond or rhombic shape.

Self adhesive labels, especially of a shape corresponding to that of the packages, may be readily applied thereto.

The product may be liquid, or solid, frozen foods, or loose products, such as snack foods.

According to a further aspect of the present invention, a form, fill and seal packaging machine comprises a carriage or frame upon which an assembly of reciprocating sealing and cutting jaws is mounted for rotation about an axis parallel to the direction of closing of the jaws and perpendicular to the direction of the bag forming, and means is provided for moving the assembly to bring the jaws to any angle within a range of angles to the direction of the bag forming.

With the assembly able to pass through a position in which the sealing and cutting jaws are perpendicular to the direction of bag forming (as the assembly moves the jaws between opposite angles), the machine can also be used, if desired, for forming rectangular (or square) bags.

The means for moving the assembly may comprise a pivot shaft for the assembly projecting through one side of the carriage or frame, a pinion on the shaft, a rack engaged with the pinion, and a pneumatic cylinder for reciprocating the rack; and adjustable stop means for the rack may be provided for when alternate sealed areas are required to have opposite angles to the direction of the bag forming. Alternatively, the means for moving the assembly may comprise a reversible stepping motor coupled, directly or through a gearbox, to a pivot shaft for the assembly in the carriage or frame.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a diagrammatic front view, partly in section of the principal components of a form, fill and seal packaging machine in accordance with one aspect of the present invention;

Figure 2 is a diagrammatic side view from the left hand side of Figure 1 and illustrating one form of formed, filled and sealed package in accordance with another aspect of the invention;

Figure 3 is a plan view of a sealing and cutting jaws assembly for use in a machine in accordance with the invention;

Figure 4 is an isometric view of part of the assembly of Figure 3;

Figure 5 is a diagrammatic illustration of the forming of another form of formed, filled and sealed package in

accordance with the invention;

Figures 6 and 7 show individual packages formed by the method illustrated by Figure 5;

5 Figure 8 corresponds to Figure 5 but illustrates a modified method in which each package is provided with a so-called euro-slot;

Figure 9 shows an individual package formed by the method of Figure 8 in the attitude in which it would hang by its euro-slot;

10 Figure 10 corresponds to Figure 5 or Figure 8 but illustrates another method of forming packages in accordance with the invention;

Figure 11 shows an individual package formed by the method of Figure 10;

15 Figure 12 corresponds to Figure 10 but illustrates a modified method in which each package is provided with a euro-slot;

20 Figure 13 shows an individual package formed by the method of Figure 12 in the attitude in which it would hang by its euro-slot;

Figure 14 corresponds to Figure 8 but illustrates a modification of the method;

25 Figure 15 shows an individual package formed by the method of Figure 14 in the attitude in which it would hang by its euro-slot;

Figure 16 corresponds to Figure 15 but shows an alternative position for the euro-slot;

Figure 17 shows yet another form of package in

accordance with the invention; and

Figure 18 corresponds to Figure 17 but shows a modification thereof.

In Figures 1 and 2 packaging film 20 is supplied in the form of a web and converted into a continuous hollow tube 21 over a hollow cylindrical mandrel 22, assisted by a collar-like guide 23, and a pressure and heat sealing device 24 forms a longitudinal seam 25. Reciprocating jaws 26A, 26B effect pressure and heat sealing across the tube 21 at intervals and a cutter 27 reciprocating within one of them cuts within the sealed areas. Product 28 is fed into the tube, in weighed or otherwise measured batches, through a funnel 29, and the tube is fed by continuously driven belts 30 and/or drawn down by mounting the sealing jaws (and the cutter) in an assembly 31 movable up-and-down in the machine, as indicated in Figure 1.

All the methodology and machinery described above is conventional and forms all the sealed areas (and the cuts therein) at 90° to the axis of the tube 21, resulting in rectangular packages.

Now, in accordance with the present invention, at least every other sealed area makes an angle with the axis of the tube other than 90°, so that, as illustrated in Figure 2 the resulting packages 32 have a shape other than rectangular. Thus the broken line position of the jaws 26A/B in Figure 2 causes them to form an inclined sealed area 33 and cut 34 in alternation with a sealed area 35 and cut 36 at 90° to the axis of the tube 21.

This alternation is effected by rotation of the jaw

assembly 31 about an axis 37 by means shown, by way of example only, in Figures 3 and 4 in which the jaw assembly has an inner frame 38 with stub shafts 39 journalled in an outer frame or carriage 40, and pinions 41 secured to the stub shafts mesh with racks 42 reciprocated by pneumatic cylinders 43A, 43B one for rotation in one direction and the other for rotation in the opposite direction, under the control of means not shown. The jaws 26A, 26B are carried by sub-frames 44A, 44B reciprocated by pairs of pneumatic cylinders 45A, 45B, and the cutter 27 is reciprocated by a pneumatic cylinder 46, all likewise under the control of means not shown. The outer frame or carriage 40 is mounted in conventional manner between vertical guide members 47, which are not shown in Figure 4.

In Figure 5 alternate sealed areas 48, 50 (with corresponding cuts 49, 51) meet and make equal but opposite angles to the axis of the tube 21 so as to form packages 52A, 52B of equilateral triangular shape, as also shown in Figures 6 and 7.

In Figure 8 the tube 21A is formed from two films with seams 25A, 25B in which are punched euro-slots 53 in alternation prior to forming sealed areas 54, 56 (with corresponding cuts 55, 57) meeting and making equal but opposite angles to the axis of the tube 21A so as to form packages 58 of isosceles triangular shape, one also being shown in Figure 9 in the attitude in which it would hang by its euro-slot 53.

In Figure 10 the tube 21 is provided with sealed areas 59 (with cuts 60) spaced in the direction of the bag forming

and making the same angle to the axis of the tube so as to form packages 61 of rhombic shape, one also being shown separately in Figure 11. The same method of formation is employed in Figure 12 but with the spacing and angle of the sealed areas 59 and cuts 60 to the axis of the tube such as to form packages 62 of diamond shape, and the jaws 26A, 26B are also provided with means (not shown) for forming additional triangular sealed areas 63 and punch therein euro-slots 53, one such package 62 being shown in Figure 13 in the attitude in which it would hang from its euro-slot.

In Figure 14 the tube 21A is again formed from two webs with seams 25A, 25B as in Figure 8, but the alternate sealed areas 54, 56 and corresponding cuts 55, 57 are spaced in the direction of bag forming to form packages 64 of trapeziform with euro-slots 53 in alternation between the respective longer portions of the seams 25A, 25B, one such package 64 being shown in Figure 15 in the attitude in which it would hang from its euro-slot. Alternatively, the euro-slots could alternate between the respective shorter portions of the seams 25A, 25B to form packages of the type 64X shown in Figure 16.

In carrying out the methods of Figures 2, 5, 8 and 14 the jaw assembly 31 has to be rotated between alternate sealed areas and cuts, while for the methods of Figures 10 and 12 the jaw assembly 31 is set at one particular angle to the axis of the tube 21 and so these latter methods could be performed with a jaw assembly not mounted for rotation, i.e., initially and permanently set at the required angle to the axis of the

tube.

Likewise, a permanently set jaw assembly could have two-part jaws (not shown) and two-part cutter having the two-parts of each jaw (and cutter) making equal and opposite angles to the axis of the tube to form chevron shaped packages such as of the type 65 shown in Figure 17 with a euro-slot 53 in an additional triangular sealed area 66 below the upper cut 67. Figure 17 also shows two longitudinal seam portions 25X, 25Y, while in Figure 18 a similar formation also has a sealed area 68 down the middle to define two package compartments 69X, 69Y.

CLAIMS

1. A method of making form, fill and seal packages comprising supplying packaging film in the form of a web, converting the web into a continuous hollow tube, feeding a product into the tube, pressure and heat sealing the filled tube at intervals, and cutting within the sealed areas, characterised in that at least every other sealed area makes an angle with the axis of the tube other than 90°.

5 2. A method as in Claim 1, wherein alternate sealed areas meet and make equal but opposite angles to the axis of the tube so as to form packages of isosceles or equilateral triangular shape.

10 3. A method as in Claim 2, wherein the packages contain biscuits, chocolates or other confectionery of corresponding shape.

15 4. A method as in Claim 1, wherein alternate sealed areas are spaced in the direction of the bag forming and make the same angle to the axis of the tube so as to form packages of diamond or rhombic shape.

20 5. A method as in Claim 1, wherein alternate sealed areas are spaced in the direction of the bag forming and make opposite angles to the axis of the tube so as to form packages of trapeziform.

6. A method as in Claim 5, wherein the angle to the axis of the tube is the same in alternate sealed areas.

25 7. A method as in any one of Claims 1 to 6, wherein a euro-slot is formed in a sealed area of each package.

8. Formed, filled and sealed packages made from a

web of packaging film converted into a continuous hollow tube and sealed transversely at intervals are characterised in that at least every other sealed area makes an angle with the axis of the tube other than 90°.

5 9. Packages as in Claim 8, wherein alternate sealed areas make equal angles to the axis of the tube.

10 10. Packages as in Claim 9, wherein alternate sealed areas meet at opposite angles so that the packages have an isosceles or equilateral triangular shape.

10 11. Packages as in Claim 9, wherein alternate sealed areas making opposite angles are spaced in the direction of the bag forming so that the packages have a trapeziform.

15 12. Packages as in Claim 8, wherein alternate sealed areas are spaced in the direction of the bag forming so that the packages have a diamond or rhombic shape.

16 13. Packages as in any one of Claims 8 to 12, wherein a sealed area of each package contains a euro-slot.

20 14. Packages as in any one of Claims 8 to 13, with self-adhesive labels of a shape corresponding to that of the packages are applied thereto.

25 15. A form, fill and seal packaging machine comprising a carriage or frame upon which an assembly of reciprocating sealing and cutting jaws is mounted for rotation about an axis parallel to the direction of closing of the jaws and perpendicular to the direction of the bag forming, and means for moving the assembly to bring the jaws to any angle within a range of angles to the direction of the bag forming.

16. A machine as in Claim 15, wherein the means for

moving the assembly comprises a pivot shaft for the assembly projecting through one side of the carriage or frame, a pinion on the shaft, a rack engaged with the pinion, and a pneumatic cylinder for reciprocating the rack.

5 17. A machine as in Claim 16, wherein adjustable stop means for the rack is provided for when alternate sealed areas are required to have opposite angles to the direction of the bag forming.

10 18. A machine as in Claim 15, wherein the means for moving the assembly comprises a reversible stepping motor coupled, directly or through a gearbox, to a pivot shaft for the assembly in the carriage or frame.

15 19. Methods of making form, fill and seal packages substantially as hereinbefore described with reference to the accompanying drawings.

20 20. Form, fill and seal packages substantially as hereinbefore described with reference to Figure 2 and any of Figures 5 to 18 of the accompanying drawings.

20 21. A form, fill and seal packaging machine substantially as hereinbefore described with reference to Figures 1 to 4 of the accompanying drawings.